

Photopyroelectric Calorimeter for the Simultaneous Thermal, Optical, Structural and Electrical Characterization of Samples Over Phase Transitions

U. Zammit^{C, S}, M. Marinelli, F. Mercuri and S. Paoloni

Università di Roma "Tor Vergata", Dipartimento Ingegneria Industriale, Rome, Italy

zammit@uniroma2.it

The study of thermophysical properties is of great importance in several scientific fields. Among them, the heat capacity, for example, is related to the microscopic structure of condensed matter and plays an important role in monitoring the changes in the energy content of a system. Calorimetric techniques are thus of fundamental importance for characterizing physical systems, particularly in the vicinity of phase transitions where energy fluctuations can play an important role. In this work the ability of the Photopyroelectric calorimetry to study the vs temperature behaviour of the specific heat and of the other thermal parameters in the vicinity of phase transitions is briefly outlined together with the integrations in the calorimetric set up giving the possibility to perform, simultaneously with the calorimetric studies, complementary kind of characterizations of optical, structural and electrical properties. A recently adopted configuration allowing measurements to be performed where no previous calibration is necessary other than the procedure used during the actual measurement is finally presented. This makes photopyroelectric calorimetry suitable for "absolute" measurements of the thermal parameters like most other existing conventional calorimetric techniques where, however, the thermal conductivity cannot be simultaneously measured.